The Citrus Industry
EXCLUSIVE SPECIALIZED CITRUS PUBLICATION
Issued Monthly
Representative of every interest
Representing no special interest

Publication office at Bartow, Florida. Entered as second class matter February 16th, 1920, at the post office at Tampa, Florida, under the act of March 3, 1879. Entered as second class matter June 19, 1933, at the post office at Bartow, Florida, under act of March 3, 1879.

Growers Give Opinions Of Florida Agricultural Experiment Station

By B. F. Carlton
Cocoa Grove Manager

Since this is the Fiftieth Anniversary of the Florida Agricultural Experiment Station, I thought that it might be well for you to have some knowledge as to what a grower thinks of the work of the station and benefist derived therefrom. First, I want to say as a whole, I think the station has a fine corps of workers doing their level best to honestly assist the grower in every way possible, and, second, I feel sure I can say that they have been of real benefit to the growers. You will understand, of course, that I am referring to citrus and to work done along that line. I have had numerous occasions in which I needed help to solve some of the problems I met in my work on the East Coast of Florida. I have found the station at all times ready, willing, and anxious to render any service possible.

I think the station at Lake Aifred has rendered a great service to the grower, not only to growers in that section of the state, but to growers as a whole and it is through that branch of the service I have received most of my help.

The things done by the station are too numerous to mention in detail. I only want to mention the use of the so called secondary plant foods such as zinc, manganese, copper, etc., and say this, that if it had not been for the work done by the station, I firmly believe numerous old groves in this state together with some of the younger ones where there was a deficiency of these metals would have been abondoned some time ago. I believe their work along this line would justify their existence and that, as you know, is only one of the many things which they have worked out.

The use of spray material has been materially benefited by the work done along that line. All together I would say that it is a much needed work being well done and I hope the state will not only keep it going as it is, but will see the wisdom of expanding the work to the extent that more of the growers in Florida will be benefited by the work being done.

By W. E. Sexton
Vero Beach Grower

For some time our organization, the Indian River Products Company, has been cooperating with the Lake Alfred Experiment Station in carrying on experiments in our groves with reference to spray work, soil analysis work and the use of some of the rare elements. These experiments have been very helpful to us and have paid big dividends.

We feel that we have been materially benefited by our spray experiments. As a result of the experiments that have been carried on in cooperation with the station we feel that we now know when to spray for lemon scab, melanose and scale. We have also had other favorable experiments with regard to the addition of wettable sulphur to our copper spray.

We are running some interesting experiments on analysis of soils to check some variations in tree conditions which we have not been able to handle under our regular methods.

It has been a relief to learn how and when to apply manganese and zinc. Under the direction of the men from the Lake Alfred Station we have taken blocks of trees that have been non-producers and by the addition of manganese and zinc have changed them from boarder trees to trees producing large quantities of beautiful, high-grade fruit.

It has been a source of great satisfaction to be able to correct some of the things that we did not know how to handle until the Experiment Station came along with a solution.

I understand that this is the 50th anniversary of the work of the Florida Agricultural Experiment Station. We wish you continued success and want you to know we are always ready and willing to cooperate with you in any experimental work that you may wish to carry on in this area.

(Continued on page 9)

Purple scale

Some Possible Reasons For The Increase Of Purple Scale Infestations . . .

By W. L. Thompson
ASSOCIATE ENTOMOLOGIST
CITRUS EXPERIMENT STATION, LAKE ALFRED
FLORIDA

Purple scale infestations apparently have been heavier and more difficult to control during the past three years than formerly. They have became more abundant in many groves that heretofore have been kept commercially free of scale with the minimum amount of spraying. One of the common theories for increase of purple scale is that the species is becoming resistant to the insecticides used, but the writer has found no evidence to support that theory. Satisfactory control has been obtained repeatedly where thorough coverage of the foliage with an oil spray has been accomplished and where there was no pile-up of scale (heavy infestation). Where there was a light to medium infestation, a decrease of 85 to 90 per cent in population was obtained by spraying with a one per cent oil. Where there was any degree of a pile-up of scale, 1¼ to 1⅔ per cent oil was more effective. Lack of coverage has been more of a factor than ineffectiveness of the oil in scale control.

There are several single factors or a combination of factors which are probably responsible for the recent scale increase. They can be enumerated as follows: (1) Increased use of residue sprays; (2) changes in cultural and fertilizer practices which in turn have changed the general condition of the trees; and (3) weather conditions.

Residue Sprays*

For years it has been an established fact that citrus trees growing adjacent to a limestone road or along a dirt road are more heavily infested with scale than trees six or more rows from the road and it is generally accepted that this is due to dust from the road. One of the first indications that the inert material in a spray might be responsible for part of the scale increase occurred in 1931, in an experiment in which hydrated lime at the rate of 10 and 20 pounds, respectively, per 100 gallons of water was sprayed on plots which were adjacent to other plots receiving lime-sulfur sprays (1). Four applications of the above sprays were made at intervals of six weeks from May to July. Population counts of scale were not made but by September the lime-sprayed trees were so heavily infested with purple scale, and to some extent Florida red scale, that the infestation could be detected from some distance, especially in October after the scale fungi became abundant. The following year the experiment was repeated in small plots in two different groves and again there was a very decided increase of purple scale on the lime-sprayed trees.

Since 1932 repeated experiments have been conducted with sprays containing varying amounts of inert residue and almost invariably there has been more of an incresae of purple scale following sprays containing inert materials of any appreciable amounts than where no inert materials were used. The same increase was noted in Florida red scale when the experiments were carried out in areas where Florida red scale were common.

In Florida the most common forms of citrus spray materials which are inert from the insecticidal viewpoint are precipitates of copper, zinc, and manganese. Copper is used as a fungicide as well as to correct copper deficiency, copper sulfate-lime (bordeaux mixture) being the most common form of spray although neutral coppers are also being widely used. Zinc sulfate is used to correct "frenching," zinc deficiency (2). In order to obtain proper results the zinc sulfate must be neutralized to form a precipitate and hydrated lime is must commonly used for this purpose. The recommended amount of hydrated lime is one-half the amount of zinc sulfate (this spray is analogous to bordeaux), and wettable sulfur is commonly added to this mixture. It is not necessary to add lime if the zinc sulfate is combined with lime-sulfur.

Manganese sulfate, also a corrective spray, is combined with hydrated lime at the same rate as is zinc sulfate (3). More satisfactory results in correcting deficiencies can be obtained with small amoun's of manganese and copper sulfates applied to the soil than is the case with zinc sulfate, and for this reason they are commonly recommended as soil treatments because of the increase of scale following their application in sprays. Some growers, however, prefer to apply these materials as a spray because of the quicker results which can be obtained.

It has been the common theory, and a very logical one, that when bordeaux mixture was used the entomogenous fungi were largely eliminated with a resultant scale increase. It is quite true that copper sprays reduce the scale fungi very decidedly and this may be responsible for some increase of scale, but the results of experiments conducted during the past seven years indicate rather conclusively that the inert residues are probably partially responsible for scale increases. For example, there is usually a more dense population of scale following a dormant spray of bordeaux 6-6-100 and a post-bloom bordeaux 3-3-100 than following similarly timed applications of a neutral copper at the rate of 4 and 3 pounds per 100 gallons, respectively, although either treatment reduces the scale fungi to a minimum. The two applications of bordeaux contained a total of 18 pounds of residue per 200 gallons and the neutral copper a total of 7 pounds. Where two applications of copper were made, whether bordeaux mixture or neutral coppers, the scale fungi were reduced to a minimum, yet the population of scale was invariably higher following the sprays with the maximum amount of inert residue.

The increase of Florida red scale following high and low amounts of residue in the spray was well demonstrated in an experiment to control citrus scab and Florida red scale. Two plots received a dormant bordeaux 6-6-100 and a later application of bordeaux 3-3-100. Two other plots received neutral coppers which are designated as Copper No. 1 and Copper No. 2. They were applied at the rate of 4-100 in the dormant spray and 3-100 in the later one. The same spreader was used for all materials and all of the plots received the same follow-up sprays which were one sulfur spray and one oil emulsion at a concentration at 1⅔ per cent oil. There was a total of 26 plots in duplicate in the whole experiment, or 13 different treatments including the check. Only four different treatments and the check plot will be discussed here so that direct comparisons can be made. In January, before the dormant sprays were made there was an average of one living red scale per leaf which represents a light infestation. By September when the scale counts were made, there had been in increase in population of red scale in all plots except the check, but the plots receiving bordeaux had a higher average number of scale per leaf than those receiving the neutral coppers. The differences in the infestation between the two sets of plots were apparent to the eye. The ratio of scale fungi to living scale was also a little

* The words "residue" or "inert residue" appearing in this article are terms to designate materials used in citrus sprays as fungicides or to correct certain deficiencies which have no particular insecticidal value.

higher in the bordeaux plots than in the neutral copper plot which would indicate that the residue was partly responsible for the heavier infestation in the bordeaux plots. In Table I are shown the average infestations for the duplicate plots as well as the ratios of fungi to living scale. There was no increase of scale in the check plot and the ratio of scale fungi to living scale was very high which was an indication that the fungi kept the scale population at a minimum. The scale fungi seem to be more effective against red scale than purple scale although no detailed work has been done except to compare the results of many scale counts in check plots and in groves where no appreciable amounts of residue sprays have been applied. Most of the experiments have been conducted in sections where purple scale is much more common than red scale.

TABLE I
Florida Red Scale Infestation Following Copper Sprays

Materials and Dilutions	Av. No. Living Per Leaf	No. Attacked by Fungi per 100 living scale
4-100 Dormant Spray Neutral Copper No. 1 3-100 Post bloom spray	2.4	4
4-100 Dormant Spray Neutral Copper No. 2 3-100 Post bloom spray	3.0	5
Bordeaux 6-6-100 Dormant spray Bordeaux 3-3-100 Petal Fall spray	6.0	21
Bordeaux 6-6-100 Dormant spray Bordeaux 3-3-100 Post bloom spray	6.1	12
Check Received no sprays	.8	393

Almost without exception there were fewer purple scale on check plots and a higher ratio of scale fungi than on plots receiving a copper spray, but when materials that have little or no fungicidal properties were sprayed on trees, purple scale increased in spite of an abundance of scale fungi. The materials referred to were zinc sulfate, zinc oxide, manganese sulfate, hydrated lime and bentonite clay. The scale fungi were reduced to a minimum following three applications, within a period of three months, of zinc sulfate 4-2-100 and zinc oxide 2-100, respectively. The following year only one application of each spray was made and by November there was a higher percentage of scale fungi in the zinc treated plots than in the check, yet the population of scale had increased in the treated plots. In plots sprayed with two applications of bentonite clay 12-100 and hydrated lime 12-100, respectively, the purple scale increased two to three times as much as in the unsprayed plot but scale fungi were as abundant in the plot receiving hydrated lime as in the check. Small amounts of inert materials used as stickers and conditioners for wettable sulfur do not appear to induce scale development to any extent.

In various experiments zinc sulfate has been added to bordeaux as well as the neutral coppers in the spring sprays and by fall there were heavier infestations of purple scale where the zinc had been added to the copper than where it had been omitted. In one experiment manganese sulfate was added to the copper-zinc spray with a resulting heavier infestation than in any of the other plots, although the scale fungi were more abundant in that plot than in any other treated plots.

It is not the intention of the writer to imply that the scale fungi are not a factor in natural control but to point out that where appreciable amounts of inert residue have been sprayed on citrus trees, scale infestations increase more rapidly than where no residue has been applied.

In the above discussion of residue sprays it has been stressed that heavier infestations of scale follow copper, zinc, and manganese sprays, but where the proper application of oil emulsion has followed those sprays, both purple and red scale have been satisfactorily controlled. The exceptions have occurred where a heavy infestation had built up prior to the application of an oil spray or where undue amounts of residue were applied as in the plot just discussed above which received a combined dormant spray of copper sulfate 6-100, zinc sulfate 3-100, manganese sulfate 3-100 and hydrated lime 9-100, followed by a post-bloom spray of bordeaux 3-3-100. The scale can be checked considerably by combining wettable sulfur 10-100 with the various sprays and if this is followed by a thorough application of oil the scale can be kept to a minimum. Scale has not been hard to control where any of the above discussed materials have been applied providing the infestation of scale was light at the beginning and the proper follow-up sprays were made before the infestation increased to any degree.

Changes in Other Cultural Practices

Recent changes in other cultural practices have no doubt indirectly influenced conditions favorable for purple scale development. It has been observed for several years that there are less purple scale on bronzed leaves than on green leaves although the leaves might be of the same age and from adjacent twigs. In 1935 while the writer was making a scale count, the infested leaves were separated from the non-infested ones and after the leaves were divided there was a decided contrast between the infested leaves which were practically all green and the non-infested ones which ranged from partially to severely bronzed.

It has been discovered that bronzed leaves are caused by a deficiency of manganesium (4) and since the deficiency has been corrected more or less in a great many groves there are more green leaves on the trees than formerly and they remain on the tree longer. Fudge (5) states that green leaves of seedy varieties of grapefruit contain 10 to 15 times more magnesium than the analogous bronzed leaves, also, that bronzing impairs the leaf area of the tree by causing a loss of leaves. The results of counts of purple scale made from two different blocks of seedy grapefruit in the Citrus Experiment Station grove indicate that the scale will thrive better and there will be a higher percentage of green leaves on trees where the magnesium deficiency has been corrected than where there is a deficiency of magnesium with a consequent high percentage of bronzed leaves.

The scale counts on which the above conclusions are based were made in a block containing plots receiving the fertilizer alone (check) and others receiving the fertilizer plus magnesium sulfate, magnesium carbonate, dolomite, and high calcium limestone, respectively. The experiment was started in January, 1937, and the scale count was made in October, 1938. There was a higher average number of living scale per leaf in each of the plots receiving magnesium than in either the check plot or the plot receiving the ground limestone. There was also a marked difference in the amount of bronzed leaves in the plots which were not treated with any form of magnesium as compared to the treated ones.

The other experiment is being conducted in a block of trees that formerly bronzed severely each year. Part of the block was treated with dolomitic limestone and the remainder was untreated. Two plots in the treated and untreated part of the block were sprayed with zinc and copper and two others received zinc, copper, and manganese. The experiment was started in January, 1937, and the scale count was made in November, 1938. At the time of the scale count there was a much higher percentage of the leaves that were green in the dolomite treated plots and also much more foliage per tree than on trees in the plots receiving no dolomite. Scale counts were made from six plots in each of the treated and untreated portions of the block. Taking the average for all plots, there were over twice as many scale on the plots where the magnesium deficiency had been largely corrected and there was a higher percentage of green leaves there than in the check plots where there was a high

(Continued on page 17)

Termites

Getting Rid Of Termites In Banked Citrus Trees

By J. R. Watson

The time of year is upon us when growers will be wanting to bank their young trees as a protection against a possible freeze this winter. The earliest date of a freeze which damaged young trees over the citrus belt, of which we have record, was that of December 12, 1934. Due to the possibility of a repetition of this early date of a freeze growers should have their trees banked soon. It is not advisable to bank earlier in the season than is necessary for protection against frost, because banked trees are liable to be attacked by insects, particularly during warm weather. The most destructive of these insects are termites, also called "white ants," and in Florida "wood lice."

Although resembling true ants in appearance, except for the color of the workers, which is dirty white, they are not at all closely related to true ants, but on the contrary are more closely related to cockroaches. However, they do have much of the colonial organization of true ants, with fertile females, called "queens", males and working casts. They are primarily feeders on wood, or materials made of wood. They are able to digest such unpromising material because of the presence in their intestines of minute organisms which break up the wood. They feed mostly on rotting or at least dead wood, but on having consumed this and facing starvation, they may attack living wood.

The danger in banking trees is that rotting wood, or dead wood, may be included in the bank. When the termites have consumed this they are liable to attack the bark on the young trees, often girdling them and, of course, causing their death. For this reason growers in banking their trees should take pains that no dead wood is included in the bank. Only good, clean soil, preferably sand, should be used. It is also important that any dead branch or tissue which will be covered by the bank be removed before the tree is banked, and the wound covered with some good asphalt paint or tar which will be repellant to the termites.

White washing the trunks of the trees will help also, providing the whitewash is made liquid so it will stick closely to the bark of the trees, and that it extend to the very base of the tree and even the larger roots. To each three gallons of whitewash add a handful of common salt to make it stick better. If the whitewash comes away from the tree in flakes it will be worse than if it was not used at all, as it will furnish a convenient hiding place for the termites.

The danger of including dead wood in the bank is greater, of course, in newly cleared land, the more so that it is such land that is commonly used for young citrus trees.

Another pest which should be excluded from the bank are ants. Ants nesting about the base of a young tree are very injurious, and will often kill it, particularly if the bank is put up too early or left too late in the spring; in other words, if present during warm weather. If the young tree has an ant nest around it the ants should be removed before the tree is banked. This is best done by digging out a shallow basin around the base of the tree and pouring in this basin a quart or so of carbolic acid emulsion. This emulsion is made by emulisifying a pint of crude carbolic acid, a pound of soap (fish oil soap or laundry soap) in three gallons of water. The water should be heated and the soap dissolved in it and then the carbolic acid added. This is best emulsified by forcing it through a spray pump several times until one gets a good, clean emulsion. This has been found to be perfectly harmless to trees and will drive away the ants. Young trees with ants around them should be treated in this manner some days before they are banked. Do not bank a citrus tree that has a nest of ants around it, as the risk to the tree from damage by ants will be greater than the risk from cold during the winter.

As soon as the danger of a severe freeze is past, about the latter part of February, the banks should be pulled down, as both termites and ants get more active as the weather warms up in the spring.

There is another, much larger termtie which occasionally attacks trees in a very different way. These are known as dry wood termites. Getting into the center of the tree, usually through a wound where decay has started, or in a wound in the roots, this larger termite works up and down in the trees, particularly grapefruit trees, until it has mined the interior of the tree so that it often is a mere shell. Mr. Thompson of our Citrus Sub-Station at Lake Alfred has found these termites up in a tree as much as ten feet from the ground. Such a tree usually has an unhealthy look. The foliage is small, sparce, likely to be yellow, the fruit small and of no value, but looking at it from the outside there are no visible signs of termites, unless the termites get into the bark too near the surface, then gumming is apt to ensue.

The gum runs down the trunk and will make long streaks. If this gum is scraped away and the bark and wood cut away for some depth one finds the center of the tree to have been hollowed out, or, one pruning off a limb will often uncover the cavity. Termites abhor light and open air and if the cavity is broken into they will hasten to repair the damage and seal up the hole with a sort of mortar which they make. So, if one, in pruning out the gum or cutting off the limbs of a tree, runs into a cavity it is an excellent idea to watch it for a few minutes and see if termites come out.

If the tree is found to be infested with termites it is rather a simple matter to exterminate the colony by dusting paris green into the hole. Termites are cleanly insects and when they get paris green on their feet they clean them with their mouth parts, as is their habit. By this means they swallow a considerable amount of paris green. Another habit of termites spreads this poison throughout the colony. They are generous creatures and have the habit of sharing the contents of their gullets with other termites and feeding it to the queen and to the larvae, thus spreading the poison throughout the colony. By this means a termite which has swallowed an amount of paris green will usually pass it on to several others before it dies and finally the entire colony and the queen, on which the future life of the colony alone depends, is poisoned.

(Continued on page 23.)

GROWERS GIVE OPINIONS OF FLORIDA AGRICULTURAL EXPERIMENT STATION

(Continued from page 5)

By Fred T. Henderson
Winter Haven

On this, the fiftieth anniversary of the Florida Agricultural Experiment Station, I want to take the opportunity to thank you and the Station for the wonderful work you have done in my grove, writes Fred T. Henderson, Winter Haven grower, to Dr. A. F. Camp of the Citrus Experiment Station, at Lake Alfred.

Knowing I am just one of many who have benefited from the work of the Station, and realizing that most of us are prone to neglect proper acknowledgement of these services, I would like to briefly review what you have done for me.

In the season 1930-31 I noticed the tendency of my Pineapple oranges towards extremely small sizes, together with a frenching condition of the trees. During the following year I tried to eliminate this condition and exhausted every known means to correct it; the trees continued to decline until they were mere skeletons. I considered interplanting young trees to replace the old ones. At this time you called on me and told me the condition had come to your attention and requested my permission to do some experimental work in this particular block. I was glad to turn it over to you, and watched with much interest the results of your work. Your experiments with the zinc showed immediate results. The following flush of growth brought normal leaves, and the unsprayed trees which you left as checks showed conclusively that you were on the right track. The trees have made rapid recovery, and for the past two years have been back to normal production.

I am sure many growers could tell stories similar to mine, and that they feel that your Station has made real progress in solving many of the growers' problems.

By M. S. Whaley
Rockledge Grower

I can truthfully say that the information and advice passed on to me by Dr. A. F. Camp and his staff at the Lake Alfred Citrus Experiment Station has enabled me to grow more and better fruit at less expense and I think every citrus grower large or small should visit the Station at least twice a year and take advantage of valuable knowledge gained from the experiments which Dr. Camp so courteously explains.

By Earl Hartt
Avon Park Grower

The press carries the information that this year is the Fiftieth Anniversary year of the Florida Agricultural Experiment Station. As a citrus grower. I want to compliment the Experiment Station upon the fine services which have been rendered citrus growers during the twenty years of my knowledge of its activities. The existence of the Experiment Station at Gainesville and the Citrus Experiment Station at Lake Alfred has lent to citrus growers a sense of security in knowing that these unbiased agencies have been pursuing programs of research of the various conditions and problems of the citrus industry, insuring progress and development during years of increasing complexities of citrus production and marketing.

Although the citrus situation in Florida is, at present, not too bright in view of the mounting production in this and competitive areas, I feel that had it not been for the work of the Experiment Stations in studying and developing efficient cultural practices in respect to soil management, cover crops, pest and disease control, fertilizers and soil deficiencies and the many allied subjects and lines of research, the situation confronting the citrus growers would today be much less encouraging than it is. Those activities have contributed vastly to the greater efficiency in cultural practices and reduced cost of production now possible. I consider a library of the bulletins based on those studies, published from time to time and made available without charge by the State Experiment Stations, an indispensable part of the citrus growers' equipment. These publications are very complete and cover a wide variety of subjects and are invaluable for study or reference.

Of particularly recent service to the citrus grower have been the studies of soil deficiencies such as zinc, manganese, magnesium and copper and the respective manifestations of those deficiencies in the foliage of the trees and the treatments devised through spraying and ground applications to correct these deficiencies. Utilization of the facts developed by this research and made available to growers has resulted in greater efficiency of plant foods, and from personal experiences, resulted in lower fertilizer costs, really amazing improvement in tree condition, fruit yield and grade.

Outstanding work has also been done in respect to research on citrus refrigeration, which has important bearing upon the keeping quality during transportation of fruit to market. Many believe that a most serious handicap to our industry has been the comparatively poorer carrying or keeping quality of Florida oranges. The very qualities which impart to the Florida orange its excellence in respect to thinness of rind and high juice content, by the same token present the difficult problem of so handling from tree to consumer that it will give satisfaction throughout that period. I hope that funds may be provided which will enable the Experiment Station to pursue a broad research program on that most vital problem. Development of more efficient methods and materials used in the building and processing of our fruit for shipment would very likely result from such a program.

The personnel of the Experiment Station merits, and I believe has, the confidence and respect of the citrus industry, generally. This is important because increased responsibilities will be placed upon them to keep apace with conditions fast developing. Much of our future depends upon their accomplishments and it is to our interest to extend to them all possible support and cooperation.

Fruit Juice

Fruit Juice Industries Make Rapid Growth

The rapid growth of the fruit juice industries during the past 9 years, from a production of little more than 1,000,000 cases in 1929 to about 24,000,000 cases during the last year, is the subject of a special article in the November issue of "The Agricultural Situation," monthly publication of the Bureau of Agricultural Economics.

"America drinks its fruit," says Gordon Ockey of the Federal Bureau, reporting that "during the fiscal year 1937-38 the American people probably drank 80,000,000 gallons of canned fruit juices, not including sizeable quantities of sweet apple cider, more than 50,000,000 gallons of canned tomato juice, and about 60,000,000 gallons of wine made from grapes produced in this country."

Ockey says that prior to 1929, grape juice and sweet apple cider were the only unfermented fruit juices consumed in significant quantities. Little tomato juice was then consumed, and commercial produc-

(Continued on page 23)

The Citrus Industry

with which is merged The Citrus Leaf
Exclusive publication of the Citrus Growers and Shippers

Publication office 550 North Broadway, Bartow, Florida
Telephone ____ 269

Published Monthly by
ASSOCIATED PUBLICATIONS CORPORATION
S. L. FRISBIE - - - - - - - - President
S. LLOYD FRISBIE - - - - - Secretary-Treasurer
A. G. MANN - - - - - - - Production Manager

Subscription, $1.00 per year in advance

SIMON PURE GROWER HELP NEEDED

Let us say in the beginning that the writer does not consider himself any great shakes as an economist and certainly he lacks much of being a financial genius, so he probably is not competent to provide a workable solution to the marketing problems of the citrus industry.

On the other hand, we consider that a modest measure of common sense entitles us to regret the action of Governor Cone in insisting that Messrs. Tilden, Walker and Clark, three outstanding citrus men, must give him their undated resignations before receiving their commissions as members of the Florida Citrus Commission to which he had announced their appointment. As we see it this action was a direct slap in the face to the entire citrus industry.

The Citrus Commission was formed to function as a strictly non-political, non-salaried organization.

Its sole purpose, as we have always understood it was to serve the industry in such a manner that the growers of the state might individually and collectively profit as a result of the semi-control which the Commission might exercise.

But the effort of the governor, at least in the three cases mentioned, to personally control the actions of the Commission certainly portends little good to the thousands of citrus growers of the state who right now need unselfish and inspired help to get at least a livable profit from this season's citrus crop.

It has often been suggested that we need a citrus czar to coordinate Florida's citrus activities for the benefit of everyone connected with the industry, but if an autocratic measure is necessary the dictator should be a gent whose inspiration should be to bring order to the industry, not to gather more power to himself.

Likewise leaders among the growers themselves could well afford to devote their efforts primarily to the improvement of the growers condition instead of using their efforts to develop a sideline with which they cannot be familiar.

We refer specifically to the action of the directors of the Florida Citrus Growers, Inc., in entering the publishing business in a field which is already crowded. The fact that this action apparently came up for consideration almost before the development of plans to secure a suitable marketing agreement were considered gives cause for modest wonderment.

The Citrus Industry has previously commended the Florida Citrus Growers, Inc., upon the potentialities of service which such an organization might render the industry and we are just as sincere in our belief today that such a body could be of great service to the growers if it would tend strictly to the job of trying to serve its grower members.

Anyone who is at all familiar with the history of subsidized publicity organs in the citrus industry of Florida, however, would hesitate to enter a field which has proven so costly to the promoters. Not a single one of these organs which has been published in an effort to make a profit today remains to tell the story.

So, as we see it, the first achievement necessary, if Florida's citrus industry is ever to thrive is the necessity of eliminating all efforts of personal aggrandizement at the expense of the industry from any plan ostensibly for the benefit of the industry.

Certainly efforts to hog-tie the Citrus Commission and chasing the will o' the wisp by entering a publishing field which readers and advertisers consider as being already amply covered, hold out little hope of substantial benefit to the individual whose life's savings and hope for future prosperity are tied up in Florida citrus groves.

THE GROWERS' PRIMARY OBLIGATION

With all this discussion about marketing systems, marketing agreements, pro-rates, growers' organization, shippers' organizations, appointments to the Citrus Commission and activities of the Commission, the citrus grower is apt to overlook his primary obligation to himself and to the consuming public—the obligation to produce the very best quality fruit possible and to see that none but good fruit reaches the market.

All these other problems are important—but secondary. Without good fruit as the basis, none of these other factors can be made to succeed. No amount of organization, no marketing agreement, no commission or committee or other activity can hope to successfully market inferior fruit at a profit to the grower.

While the grower should and must interest himself in the solution of his marketing problems, his primary interest is and should be his grove, its proper care and protection, to the end that the fruit produced shall be of superior quality.

Proper fertilization, protection from fruit diseases and fruit pests, frost protection, proper cultural practises should hold first place in the mind of the grower. Having first produced superior fruit, he will be in better shape to solve his other problems—but the production of high grade fruit comes first.

1. Citrus fruit, marketing
2. Fruit, color

"Color-Added" And Its Relation To Our Citrus Marketing Problems

By FRANK R. SCHELL

This article has been written in the belief that by presenting the facts it is possible to dispel the apparent widespread misconception of the function of and results derived from certain processes, such as the ethylene gas process and "color-added," which enhance the attractiveness, and thereby the sales value, of Florida oranges.

The "color-added" process has brought millions of dollars in premiums paid for "color-added" fruit, over uncolored fruit of the same quality, to the growers and shippers of Florida. The Florida citrus industry is no philanthropist where processing is concerned. The industry has used "color-added" on more than 50 per cent of the oranges shipped out of the State of Florida since this process became available. If the industry was not deriving benefit therefrom, it may safely be assumed that "color-added" equipment would long since have been thrown out of every packing house in Florida.

The writer originated the "color-added" process and has devoted years of effort to developing and protecting the **proper** use of the process. Therefore, no pretense is made that the writer is not prejudiced in favor of "color-added." However, the statements of fact herein, from which that prejudice derives, are substantiated by the records.

Further, we make no pretense that the "color-added" process is finally perfected in all the details of its application or in every aspect of the results had therefrom. Possibly all processing is a necessary evil, at best, — but it is necessary. It would, of course, be preferable to ship our fruit just as it leaves the tree, but since this is impossible, as will be shown, we can only do our utmost to see to it that the benefits of processing outweigh any undesirable features. The industry's use thereof proves that this has been accomplished in the case of "color-added." Nevertheless, we are continually striving for further improvement of the process. Thus, one of the questions long under investigation, looking to improvement and correction, if necessary, is that of

TEMPERATURES USED IN THE "COLOR-ADDED" PROCESS, AND THEIR EFFECT ON FLAVOR

In some quarters the belief is held that the temperatures to which the fruit is subjected in application of the "color-added" process have adversely affected the flavor of Florida oranges. The temperatures used vary (except where "cold" or "cool" processes are used), from 120 to 135° F.

Our investigaton does not support this belief, except, possibly, in cases where the inner temperature of the orange is at 90° F., or higher, when the orange enters the coloring solution. Oranges hot from the sun, or from water coloring rooms, should be allowed to cool until the juice temperature is not higher than 70 to 75° F., before coloring.

Numerous factors affect the flavor of oranges. Flavor is, to some extent, a varietal characteristic, varying between varieties, between trees of the same varieties, and between oranges on the same tree according to their position, date of bloom, and the like. Not all oranges are naturally flavored. Soaking tank mixtures and rough handling in packing houses have their effect on flavor.

We are continuing our investigation of these and other factors and are hopeful that the results, when had, will result in enhancement of flavor in addition to the enhancement of color, already attained.

In the meantime, if any packing house operator feels that the higher temperatures used in some processes are injuring the flavor of our oranges, it is unnecessary for him to continue the use of those temperatures. Either of the firms at present authorized to license the use of "color-added" under the Harvey patents can furnish coloring materials that give entire satisfaction at temperatures of 110 to 115° F.

A number of houses are using these lower temperature processes. We are checking the results to determine what effect, if any, higher temperatures have on flavor, as compared with fruit processed at lower temperatures. If there is any conclusive evidence that the higher temperatures are injurious to the flavor of the fruit, we expect to petition the industry to sponsor a further amendment to the "Color-Added Act" by the 1939 Legislature, prohibiting the use of temperatures higher than 115° F. in applying any "color-added" process, unless it be found that the Citrus Commission already enjoys the power to cure the situation by appropriate regulation.

THE ETHYLENE-GAS AND "COLOR-ADDED" PROCESSES ARE ETHICAL AND LEGITIMATE MARKETING PRACTICES WHICH SHOULD BE ENCOURAGED

Among other "cures" for the ills of the Florida citrus industry has been the often urged elimination of all processing of citrus fruits, aside from washing and grading. We frequently hear or see in print that all our troubles will be over if we will ship only "tree-ripened" or "tree-colored" fruit.

As an example of this kind of suggested "cure-all," the following recently appeared in one of our South Florida papers:

> **"What is really needed, and ALL that is needed, is to do away with all 'color-added' processing and permit fruit to be marketed on its true appearance and taste. After a year or two the consuming public will learn that Florida fruit is palatable when offered. That will be more economical, it will be fair to all concerned, and it will certainly not be hood-winking the purchaser who now often buys fruit because it looks good and then casts it into the trash-can because it tastes bad."**

Most similar statements are directed against the "color-added" process. Possibly this is due to the fact that "color-added" is new. Before "color-added" was invented, the ethylene gas process was the villain, although that process was invented, perfected and developed by a scientist of the United States Department of Agriculture in furtherance of the Department's efforts to meet the pressing need of the industry. The ethylene process came into use in Florida only after it had been in use elsewhere for some years, when Florida citrus had to meet that competition or quit.

There is another class composed of those who seek only their own selfish ends, at the expense of the industry, by advertising their own fruit as "tree-ripened" and "tree-colored" — thereby conveying the thought that citrus fruits can be and are being artifically ripened; that artificial coloring of mature citrus fruits is a practice of cheats and swindlers and that both processes re-

(Continued on page 16)

"COLOR-ADDED" AND ITS RELATION TO CITRUS MARKETING PROBLEMS

(Continued from page 13)

act to the detriment of and deceive the consumer.

To this class we have to say only that they are not helping themselves. Instead, they are hurting the industry generally, and, accordingly, their own interests, for by such advertising distrust of all Florida citrus fruit is created in the mind of the consumer.

The press can cure this situation, in part, by refusing these people the publicity they crave. The industry should procure enactment of legislation prohibiting the use of the terms "tree-ripened" or "tree-colored" on any brand or in any advertising, as being in itself intended to deceive the public, for the argument that artificial coloring of mature citrus fruits is improper, hence we should ship only "tree-colored" fruit, is as fallacious as the intimation that citrus fruit can be "ripened" off the tree.

Nothing is more certain than the fact that the housewife, when offered a choice between two articles of food, both having the same food value, will purchase the article that presents the more attractive appearance, unless given a "fire-sale" price on the unattractive article.

The producer's problem in making oranges attractive to the consumer was succinctly stated by the Department of Agriculture in its yearbook for 1932, pp. 134-137, as follows:

> "Some of the early fall varieties of oranges and grapefruit ripen while the fruit is still green in color. Later varieties that mature in the spring or summer assume the color of full maturity during the winter while the fruit is still immature, but when warm spring weather occurs the rind may turn green again. Thus while the edible part of the fruit ripens, there is a 're-greening' of the rind. Grapefruit growing inside of densely foliated trees never develops full color, although some of the best-flavored fruit is produced there. **There is, therefore no definite relation between flavor or maturity and the color of the fruit while on the tree. However, there is a very significant relation between the color of the fruit offered for sale and the price that it will bring, and citrus fruit producers have always faced the problem of making the color of ripe fruit match its flavor."** (Emphasis ours.)

Further, the U. S. Department of Agriculture as far back as 1923, in its Bulletin No. 1159, entitled "Coloring Satsuma Oranges in Alabama", has this to say:

> "It is well known that citrus fruits grown under certain climatic and cultural conditions may be mature and highly desirable for food while the skin of the fruit is still green in color. * * * In general when it reaches full color on the trees the fruit in this region is characterized by a low acidity with a comparatively high sugar content, and the overripe fruit is inclined to be insipid in flavor. **It is important then, if this fruit is to be furnished to the consuming public in its most desirable condition for food, that it be harvested before it becomes yellow on the trees.**
>
> " * * * On the other hand, **green colored fruit, no matter what the quality, is difficult to merchandise. In the mind of the consuming public a green colored orange is immature and unfit for food. The public desires fruit for decorative purposes as well as for eating, and a well colored orange is much more attractive than one green or partially green in color. The green colored fruit is therefore at a decided disadvantage in competitive selling. It is evident then that some method of treating this fruit so that it would assume a rich orange yellow color early in the season, when it is most desirable for food, would be of benefit to the industry and to the consuming public alike."** (Emphasis ours.)

If Florida enjoyed a monopoly in citrus production, it might be well to again attempt to market only "tree-colored" citrus fruits, if for no better reason than to demonstrate the futility of "cure-alls." We say "again" because the attempt was made, with disastrous results, thirty years ago.

In 1909 there were no artificial coloring processes, in either Florida or California. Of necessity, we shipped only "tree-colored" fruit. Presumably, the industry should then have been enjoying limitless prosperity, if the advocates of "ship only tree-colored fruit" have basis for their recommendations. Exactly the reverse was true.

Our horticulturists had developed, even then, both early (Parson Brown) and late (Valencia) varieties. Then, as now, our early varieties matured, and became over-ripe, insipid and, at times, dried up, before the color of the peel changed from green to yellow or orange. Then, as now, our late varieties colored up beautifully while wholly immature, turning green again, at least partially, sometimes wholly, as they ripened.

Both California and Florida tried to market this green-skinned fruit, in its proper season, at the peak of its perfection. The consumer refused to buy — for the reasons recited in the bulletin last above quoted. Having failed in the attempt to persuade the consumer to buy oranges that bore Nature's "tree-color", which color is **green** on early and late varieties, both Florida and California tried to market their fruit by shipping it when it bore an orange coloration, "tree-colored" at Nature's whim. The early varieties were held back until they attained the orange color which the consumer, mistakenly, believes is the indication that an orange is ripe. By that time these early oranges were often unfit for food. They were insipid, in many instances so dried out that under our present laws they would be classified as unmarketable culls. The late varieties were shipped before they lost their orange coloration, that is, while still immature but beautifully colored. At the same time both states were shipping mid-season varieties, in which palatability, food value and color were combined. When the consumer bought oranges, he had but one chance in three that his purchase would be fit to eat. Added to this was the fact that Florida and California were attempting to market their entire crop between December first, at the earliest, and April first, that is, during the time when Nature's "tree-color" was on the fruit. The result was inevitable — consumers quit buying oranges, markets were glutted and demoralized, and the citrus industry, of both states, was on the verge of bankruptcy.

In 1910 it was discovered that the green coloration of citrus peel could be blanched out by the use of fumes from an oil stove or the exhaust of a gas engine. It was subsequently learned that the most active blanching agent in these fumes is ethylene gas. Today commercial ethylene gas is the standard blanching agent.

We digress for a moment at this point to dispel another and apparently commonly accepted fallacy regarding ethylene gas — that by its use citrus fruits may be " artificially ripened." Nothing could be further from the truth. It is true that in the case of some fruits, particularly bananas, there is a necessary conversion of starches into sugars as the fruit ripens and that exposure to ethylene gas will accelerate that conversion and the ripening of such fruits. However, there is no more than a trace of starch in the edible pulp of citrus fruits at any stage of their growth, hence there is nothing upon which the ethylene gas can act, and the gas has no effect whatever as a "ripening" agent for citrus fruits. Nor have we yet discovered any means of prolonging the ripening period for citrus fruits after picking. It is unfortunate that this is true, for if we could pick our crop, store it, and permit it to slowly attain maturity in storage, as can be done with some fruits, we could thereby extend the Florida and Texas shipping season throughout the year, which would be of material aid in solving our marketing problems. Therefore, when a person talks or writes about "artifically ripened" citrus, or brands his fruit "tree-ripened," he is either ignorant, or he is vicious in that he would have the consumer be-

(Continued on page 18)

SOME POSSIBLE REASONS FOR THE INCREASE OF PURPLE SCALE INFESTATIONS

(Continued from page 7)

percentage of bronzed leaves. The whole block had been sprayed with oil and the infestation was not heavy on any of the treated plots, nevertheless, there was a significant difference between the plots having a high percentage of green leaves and those with a high percentage of bronzed leaves. The details of the scale count are shown in Table II.

TABLE II

Purple Scale Infestation on Green and Bronzed Leaves

Materials Used as a Spray

	Av. No. Living Scale per Leaf Plots with high % green leaves	Plots with high % bronzed leaves
		Dolomite plots
Zinc, Copper Sprays	1.88	.60
Zinc, Copper, Manganese Sprays	1.32	1.16
Zinc Copper Sprays	4.40	1.32
Zinc, Copper, Manganese Sprays	5.32	2.32
No Sprays	1.68	.76
No Sprays	2.48	1.20

Shade

Shade is probably an important factor in purple scale development. Trees that are in a good growing condition usually have more leaves than those of less vigor. When some of the amendments have been made the trees not only retain their leaves longer but the foliage is more dense. Purple scale is classed as a semi-shade loving insect, so it is only natural to expect heavier infestations on well-shaded trees than on those of sparse foliage. Scale have increased quite rapidly in some groves that are being brought back to so-called normal growth, and the foliage has become more dense than formerly. The question arose as to whether scale increases were due to the correction of certain deficiencies, thus making the leaves more suitable for scale development, or whether the increased shade was a factor. In the block of grapefruit trees where the dolomite experiment is being conducted, the trees are rather irregular in size and the foliage is more dense on some trees than on others. A second scale count was made from trees in the dolomite treated plots to determine whether there were more scale on trees with a medium amount of foliage than on ones with less foliage. The leaves for the scale count were collected from the inside canopy of the tree. The trees in each plot were rated in two classes of four each, namely, medium foliage and light foliage. In each of the five plots there was a higher average of living scale per leaf on trees rated as medium foliage than on those rated as light foliage. In the five plots (a total of 20 trees) of medium foliated trees, there was an average of 17.8 living scale per leaf compared to an average of 4.9 on the light foliated trees. More data should be collected along the same line before definite conclusions can be made, but from general observations of scale infestation in any one grove, it has been noted that there are usually more purple scale on trees with medium to dense foliage than on those with sparse foliage.

Climatic Conditions

Climatic conditions are always more or less a factor either favorable or unfavorable in insect behavior from year to year. During the fall months of 1936 and 1937 there was enough rainfall to keep the trees in a vigorous condition and in the following January of each of those years there was exceptionally warm weather. In January of 1938 there was a hatch of purple scale which probably resulted in an extra generation for the year. The above conditions may or may not have been factors in the rather rapid scale development during the past year.

Exceptions

Exceptions to the general results obtained not only occurred in the experiments but in certain commercial groves. Occasionally there is as heavy an infestation of scale following bordeaux 3-3-100 as following bordeaux 6-6-100. In one experiment there was a much heavier infestation following a neutral copper 3-100 than following either bordeaux 6-6-100 or bordeaux 3-3-100. In most groves the scale infestation would have increased to a very marked degree if either full-strength or half-strength bordeaux had been applied for three consecutive years with no follow-up spray except one light sulfur application, but in one experiment with that program the infestation has not increased to the extent that might be expected. Some of the groves that have received the amendments, with the trees now in a vigorous condition, have not become infested with scale to the extent that many others are infested. Scale increases are sometimes deceiving in groves that have received residue sprays or applications of materials to correct deficiencies. The first year or following spring the trees respond with a fine flush of growth and the scale may not be noticed because of the increased amount of foliage and a general light infestation, but late in the fall or during the next year the infestation has increased to the extent that many small twigs are killed and the fruit and leaves are also heavily infested.

These exceptions have been included in the discussion because in some years or in some individual groves the response to certain treatments is quite different than might be expected. Many of the variations cannot be accounted for while others may be due to the location of the grove, method of application of material (thoroughness or lack of thoroughness) and climatic conditions.

References

1. Thompson, W. L. Lime Sulfur Sprays for the Combined Control of Purple Scale and Rust Mites. Fla. Agr. Exp. Sta. Bul. No. 282, July, 1935.

2. Camp, A. F. Zinc Sulfate as a Soil Amendment in Citrus Groves. Proc. Fla. State Hor. Soc., 1934.

3. ———— and Walter Reuther. Studies on the Effect of Zinc and Other Unusual Mineral

(Continued on page 20)

"COLOR-ADDED" AND ITS RELATION TO CITRUS MARKETING PROBLEMS

(Continued from page 16)

lieve that other Florida citrus, but not his, is "artificially ripened."

Returning now to "artificial coloring" of citrus fruits: With the adoption of artificial coloration practices, in 1912 and thereafter, the situation changed as if by magic. The length of the Florida shipping season was doubled, while in California, where they do not have a summer rainy season, it is possible to ship throughout the year, with each variety moving in its proper season. Instead of an unmarketable surplus, there was suddenly a shortage. Prices skyrocketed — the "golden era" of the citrus industry had arrived — born of "artificial coloring" practices.

During the 1909-10 shipping season the total production of all citrus fruits in the United States, including lemons, was but 24,000,000 boxes, of which less than 20,000,000 boxes were oranges. During the present shipping season, we must market a citrus crop that is well over 100,000,000 boxes. Yet we are told, by those who presume to speak as having knowledge of the subject:

> "What is really needed, and ALL that is needed, is to do away with all 'color-added' processing and permit fruit to be marketed on its true appearance and taste. After a year or two the consuming public will learn that Florida fruit is palatable when offered. That will be more economical, it will be fair to all concerned, and it will certainly not be hood-winking the purchaser who now often buys fruit because it looks good and then casts it into the trash-can because it tastes bad."

We note that the author fails to suggest what we are to do for money, or with citrus crops of 50,000,000 boxes per annum, while waiting "a year or two" for the consumer to decide to buy green-skinned citrus fruits, in preference to California's highly colored navel oranges which, likewise, are artificially colored. Nor does he explain wherein lies the economy. Presumably he refers to some saving in the cost of processing, but the value of one season's crop, at $1.00 per box, packed, would pay the cost of processing for better than 80 years. Nor does he explain to whom his suggestion will be "fair." Certainly it would not be "fair" to the Florida industry.

Further, if "color-added" is to blame for low market prices on oranges, how does he explain the even lower prices on grapefruit, upon which "color-added" is not used?

The first sentence above quoted recommends only that we dispense with "color-added." We are, of course, entitled to the benefit of every legitimate, ethical marketing practice. This brings us to the question of whether, in fact, any violation of highest ethical principles results from the use of "color-added." The facts disclose no such violation.

The first time "color-added" was demonstrated in Florida, those who saw it were informed that the process would not be permitted to be used except on oranges of good eating qualities. The writer was in correspondence with the Federal Bureau of Agricultural Economics, in January, 1933, when the process was in the laboratory stage, looking to the determination of standards of quality to be required of "color-added" oranges and methods of enforcing those standards. When the process went into use in October, 1934, the license agreement bound the packing houses to use the process only upon fruit attaining these higher standards of quality, and to employ Federal inspectors to test the fruit before coloring. These same standards were later written into the first "Color-Added Act."

The process was a smashing success from the first. Unfortunately, the servicing organization was unprepared to meet the demand for coloring equipment. This opened the door for infringers who saw a chance to benefit from the work of those who had conceived and developed the process. These people sold coloring solutions and equipment without any requirement that the fruit pass other than the State and Federal maturity test, which requires only that the juice contain eight parts of solids (sugars) to each part of acid. Even this requirement lapsed at the end of the regular inspection season. We suffered a disastrous freeze in December, 1934, and by late January, 1935, fruit was beginning to show marked dryness from freeze damage. Users of infringing coloring processes used "color-added" on this frozen fruit. There was a storm of protest from Northern markets, which almost resulted in outlawing the process. The industry moved promptly to procure enactment of regulatory legislation. The 1935 Legislature passed the first "Color-Added Act." This law required that "color-added" oranges not only pass the "8 solids to 1 acid" test, but also fixed a permitted minimum percentage of solids, and a permitted minimum juice content of 4½ gallons per packed box, "the juice to be extracted by hand, without mechanical pressure."

In 1937 this Act was further amended, the 8-to-1 test was raised to 8½-to-1, and the permitted minimum percentage of solids was raised.

The first commercial use of "color-added" was in California, as was true of the ethylene process. The writer, while in California in 1933, worked out tentative standards of quality for California "color-added" oranges. The 8-to-1 test was continued therein. No minimum percentage of solids was included — California oranges have so little juice that the solids content is usually high enough. The juice test was was fixed at 3½ gallons per box on Valencias, 3 gallons on navels. When the time came to put the process into commercial use, the juice test was reduced to 3 gallons per box on Valencias, and 2¾ gallons on navels.

Compare the attitude of the industry in the two states — and be proud of the Florida industry, which wrote into the first law the standards required in our license contracts, and then raised the standards in the interest of the consumer, instead of lowering them. Today, Florida "color-added" oranges must meet the highest test, comparatively, that any state has ever dared impose upon its major agricultural product. Those standards were self-imposed by the industry.

In Florida, our citrus maturity and "color-added" laws are enforced by a well trained, competent staff of State Inspectors, the packing house manager not even knowing from day to day what inspector will be in his house.

In California the enforcement of all such laws is in the hands of an employee of the packing house. He is hired, fired and paid by the packing house. He is, of course, sworn in as an inspector by the County Boards of Agriculture.

When next we feel the urge to tell the Florida industry how much better all things are done in California, it might be well to reflect upon the comparisons above set forth.

We have eaten "color-added" oranges repeatedly in the markets since the 1937 Act was passed. We have not found, nor heard complaints of, sour and immature "color-added" oranges on the market — and we believe we hear practically every complaint made, sooner or later. We heard no complaints, following the last freeze, that Florida was shipping frozen "color-added" oranges.

We have found "color-added" oranges on the markets that were deficient in flavor because of low acid content, a characteristic of some early varieties. We have, therefore, come to the conclusion that a permitted minimum of acid content of not less than 1%, should be added to the present law, so as to prevent the coloring of oranges that are of inferior eating quality because of too low acid content.

To summarize, Florida is today guaranteeing the food value and palatability of her "color-added" oranges. The "color-added" stamp evidences that guarantee.

Therefore, as to the charge that the use of this process is improper, and an unethical attempt to "hoodwink" the consumer, we think that the charge is clearly disproven. If there remains any doubt on ethical grounds, we again call attention to the foregoing quotation from the yearbook of the U. S. Department of Agriculture for the year 1932, pp. 134-137, where the Department stresses the problem of the producer in "making the color of ripe fruit match its flavor."

Having, as we believe, contributed

to the solution of that problem, we are willing to rest our case on the following quotation from the U. S. Department of Agriculture Bulletin No. 1367, May, 1926, which reads, in part:

"From a careful survey of the field, apparently there was no basis for the conclusions that the color of citrus fruit is an indication of its dessert quality or attractiveness as an article of diet and that the color of the skin of the fruit when it has reached this stage in its development is partly a varietal characteristic and partly dependent upon the climatic and cultural conditions under which the fruit is grown. **It is obvious, then, that treating fruit which is physiologically mature or has reached a stage in its development at which it has high dessert quality, so that it assumes a color or appearance pleasing to the eye and has a higher decorative value, is a legitimate practice in marketing and one which should be encouraged."** (Emphasis ours.)

Summary

The attack upon the industry's coloring practices may be summarized under two headings:

1. **The process impairs the flavor of oranges.**

As to whether this is true, opinion is divided. If it is true, it need not continue, since lower temperature processes are now available.

There is, as yet, no definite proof that various other factors mentioned herein are not responsible, nor that "color-added" is responsible, although we have diligently sought the truth in that regard.

2. **Florida should ship only "tree-colored" citrus.**

We believe that we have demonstrated that the arguments advanced in support of this premise are based wholly on "wishful thinking."

Until some basis can be found in the facts for asserting that Florida's processing practices are either economically unsound or ethically improper, those practices should receive the approbation and the vigorous defense of every person interested in the welfare of our citrus industry.

It is respectfully submitted that no such facts have thus far been advanced.

He (as they drove along a lonely road) — "You look lovelier to me every minute. Do you know what that's a sign of?"

She — "Sure. You're about to run out of gas."

"Any luck?" asked Ed as he came upon Al fishing in a pond.

"No," answered Al, sadly. "Are there any fish in this pond?"

"Don't know. The pond wasn't there yesterday."

Whatever youth lacks in experience is made up in enthusiasm.

HAWAIIAN FRUITS AND VEGETABLES TO BE ADMITTED TO UNITED STATES

Modification of the fruitfly regulations affecting the movement of products from Hawaii to the mainland, effective November 1, has been announced by Lee A. Strong, Chief, Bureau of Entomology, and Plant Quarantine.

Experimental work carried on at field stations of the Bureau, Mr. Strong said, has developed the fact that exposure to heat or to cold under controlled conditions for a specified time will destroy immature stages of the Mediterranean fruitfly or the melon fly that may be present.

SOME POSSIBLE REASONS FOR THE INCREASE OF PURPLE SCALE INFESTATIONS

(Continued from page 20)

Supplements on the Growth of Horticultural Crops. Fla. Agr. Exp. Sta. Ann. Report 1937.

4. Bahrt, G. M. Progress Report on Soil Fertility and Fertilizer Experiments on Bronzing of Citrus. Proc. Fla. Hort. Soc., 1934.

5. Fudge, B. R. The Relation of Magnesium Deficiency in Leaves of Grapefruit to Yield and Chemical Composition of Fruit. Fla. Agr. Exp. Sta. Bul. in press.

6. Thompson, W. L. Different Methods of Oil Application. The Citrus Industry, Vol. 19, No. 7., 1938.

TIME TABLE OF RADIO BROADCASTS OF TEMPERATURE BULLETINS IN EFFECT NOVEMBER 1, 1938.

(Continued from page 3)

All stations give frequent additional service when frost is forecast.

Florida Radio Stations Broadcasting Official Temperature Bulletins:

Station	City	Kilocycles	Day Power	Night Power
WJAX	Jack'ville	900	5000	1000
WMBR	Jack'ville	1370	250	100
WFOY	St.Aug'tine	1210	250	100
WRUF	Gainesville	830	5000	off
WMFJ	D. Beach	1420	100	100
WDBO	Orlando	480	5000	1000
WLAK	Lakeland	1320	250	100
WDAE	Tampa	1220	5000	1000
WFLA	Tampa	620	5000	1000
WSUN	St. Pete	620	5000	1000
WJNO	W.P.Beach	1200	250	100
WKAT	Miami B.	1500	100	100
WIOD	Miami	610	1000	1000
WQAM	Miami	560	1000	1000

1, Citrus Fruits, By Products

2. Cows, feeding

Cows Now Fatten On Citrus Refuse

At one time cotton seed were dumped into the Mississippi and other rivers to get them out of the way. Today they often represent the profit on the cotton crop. Other instances of the utilization of waste products are numerous, and in some cases profitable industries have been built entirely on goods formerly not utilized and sometimes even disposed of at considerable expense.

Industrialists and formers now realize that in proportion as practically all parts of a farm product can be commercially utilized, the output is likely to prove profitable. Florida citrus fruits in this respect are not essentially different from other crops.

Recognition of this fact has long existed among growers and shippers. Canneries and by-product factories have been developed that more of the oranges and grapefruit might go into consumption. While these plants have absorbed much of the lower grade and surplus output, they take by no means all of it. Further, their operations in themselves create a vast volume of waste.

Surveys have disclosed that between 65 and 75 per cent of the grapefruit processed by canners remained as refuse and was discarded. Waste at the canning establishments of Florida, in the five year period which begun with the 1929-30 season and ended with the 1933-34, averaged 64,642 tons annually.

Avenues for the profitable utilization of grapefruit cannery waste have been sought by the Florida Agricultural Experiment Station with a considerable degree of success. Investigations concerning the feasibility of converting the refuse into feed for livestock have revealed promising possibilities along that line. Feeding tests with the material gave excellent results.

Jersey cows in the Experiment Station herds learned to eat this product of their own volition, in from one to six days, when it was offered to them after they had finished with rations fed daily. Steers accepted the feedstuff freely from the beginning of the time when it was supplied.

Digestibility of the feed was demonstrated in other experiments. Since few products can be used as the sole diet of animals, in these studies the cannery refuse was combined with cut No. 1 alfalfa hay and cottonseed meal, and fed dry.

Cattle consuming the mixture in large proportions soon took on a sleek, oily appearance, indicating thriftiness. A moderately laxative effect of the new feed also was observed in checking up on the animals.

Grapefruit cannery waste used in the feeding tests included the peel, the rag and a few seeds. Moisture content had been reduced to eight or ten per cent from more than eighty.

Processes have been patented which dry the refuse by means of pressing and exposure to heat. After bagging, it stands for a short time in air-dry warehouses.

In the dried form, as fed at the Station, the cannery leavings constitute a concentrate, high in digestible carbohydrates and low in protein. Use is suggested as a substitute for part of the corn feed meal furnished to animals. The place of dry beet pulp might also be taken.

Research on the subject covering other aspects still is under way at the State Agricultural Experiment Station, in Gainesville.

When all parts of this state's citrus fruits are utilized, growers will find

their groves more profitable than at present. In effort to that end the Experiment Station is supplementing its services bearing on fruit production.

GETTING RID OF TERMITES IN BANKED CITRUS TREES

(Continued from page 9.)

A few ounces of paris green dusted into a hollow tree is usually sufficient to ultimately kill the termites, and possibly give the tree a chance to recover.

This big termite has been found in other trees besides the grapefruit which it is most apt to attack. It is occasionally found in orange trees and has been found in oak trees, both in the live oaks and willow oaks, and in avocadoes. Probably in many cases the infestation in citrus trees is the result of migrations from oak trees in the neighborhood, or those which stood on the ground before the grove was planted.

FRUIT JUICE INDUSTRIES MAKE ASTONISHING GROWTH

(Continued from page 9)

tion of grapefruit juice, pineapple juice, orange juice, lemon juice, and various nectars was yet to be developed. In contrast, almost 24,000,000 cases of fruit juices were packed last year, and more than 16,000,000 cases of tomato juice.

Citrus juices comprised about one-half of last year's high record fruit juice pack, with grapefruit juice making up about three-quarters of the citrus juice pack. Nine years ago, it was 8,800,000 cases. Only 38,000 cases of orange juice were produced at the beginning of the current decade; last year the production was 1,700 000 cases. Largest increases in the citrus juice output have occurred since 1933-34—from 1,000,000 cases in that season to nearly 12,000,000 cases in 1937-38.

Pineapple juice was practically unheard of in this country as recently as 5 years ago.In that season, 1,000 cases were received from Hawaii. The following season, receipts of pineapple juice jumped to 1,600,000 cases. Last year, the receipts totalled 8,800,000 cases, comprising about one-third the total supply of canned fruit juices.

Increased production of juices is attributed to two factors: (1) Increased consumer demand for juice products, probably due largely to a general appreciation of their convenience for use as breakfast foods, dinner cocktails, and in mixed alcoholic drinks; (2) increased supplies of fruits resulting in the necessity of increased diversion of fruit from the fresh market to by-products use.

The Citrus Industry Want Ads

WANTED — Two thousand sweet seedling root stock, lining-out or better. H. M. Sherwood, Fort Myers, Florida.

ROSES—Two year, fieldgrown, everblooming varieties. Fall planting best. Free catalog. Tytex Rose Nurseries, Tyler, Texas.

THRIFTY TREES and budwood from record performance Perrine Lemon parents. Persian Lime and other citrus varieties. DeSoto Nurseries, DeSoto City, Fla.

THOUSANDS of Rough Lemon Seedlings, six to twenty inches high. $1.50 per hundred; $12.50 per thousand; ten thousand or more at $10.00 per thousand. Strong field grown plants. INDIAN ROCK NURSERIES, Largo, Florida.

SCENIC HIGHWAY NURSERIES has a large stock of early and late grapefruit and oranges. One, two and three year buds. This nursery has been operated since 1888 by G. H. Gibbons, Waverly, Fla

ALYCE CLOVER SEED. Ripe and cleaned. Ideal cover and hay crop. Write for information. P. E. Synder, Box 866, Lakeland, Fla.

SEEDS—ROUGH LEMON, SOUR ORANGE, CLEOPATRA. Pure, fresh, good germination. Also seedlings lineout size. De Soto Nurseries, DeSoto City, Fla.

ALYCE CLOVER, the best legume for hay or covercrop. Write for information. Hardin Groves, Box 63, Lakeland, Fla.

CITRUS SEEDLINGS

Cleopatra, Sweet Seedlings, Sour Orange, Rough Lemon, Grapefruit. New low prices. Grand Island Nurseries, Eustis, Fla.

HARDIN'S sPERRYOLA Lemon, a profitable adapted commercial variety for all sections. Hardy, prolific grower and producer. Limited number choice trees. Hardin Nurseries, Box 63, Lakeland, Fla.

SEED—Rough lemon, sour orange, cleopatra. New crop from type true parent trees. Also thrifty seedlings. DeSoto Nurseries, DeSoto City, Florida.

NEW COMMERCIAL lemon for Florida, the Perrine; proven. All residents need yard trees, keeping Florida money at home. Booking orders for budded stock for Winter delivery. DeSoto Nurseries, DeSoto City, Fla.

BUDDED trees new Florida commercial lemon, proven, thin skinned, juicy, scab immune. Also rough lemon, sour orange and Cleopatra seed and liningout seedlings. DeSoto Nurseries, DeSoto City, Fla.

AVOCADOS — All desirable varieties. Haden Mangos, Persian Limes, superior budded Loquats. Coral Reef Nurseries Co., Homestead, Florida.

ALYCE CLOVER

Fresh crop, cleaned, and inoculated. Also Crotalaria Spectabilis, Intermedia, Striata. Write for new low prices. Grand Island Nurseries, Eustis, Fla.

CHOICE Rough Lemon Seedlings 6 to 20 inches high, $10.00 per thousand. Olan Altman, Sebring, Florida.

CROTALARIA SPECTABILIS — Fresh crop, $15.00 per 100 lbs. f. o. b. Frostproof, Fla. Milton Woodley, Frostproof, Flo.

"MAIL ORDER Operator desires contact with grower of high grade avocado pears. Have interesting proposition for grower of highest quality fruit." F. R. Gardner, P. O. Box 528, Greenville, Pa.

FOR SALE—2000 Riverside No. 10 Grove Orchard Oil Heaters used only two seasons, excellent condition. 70c each, F.O.B. Marianna subject to prior sale. Marianna Fruit Company, Marianna, Fla.

CITRUS NURSERY TREES

All standard varieties and novelties, on Cleopatra and Sour Orange root. Grand Island Nurseries, Eustis, Fla.

MANURE — Stable and Dairy Manure in car lots. Write for prices. P. O. Box 2022, Jacksonville, Fla.

STANDARD varieties of citrus trees including Persian limes and Perrine lemons at reasonable prices. Ward's Nursery, Avon Park, Fla.